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ABSTRACT

Upward Bound is a federally funded program designed to motivate and prepare selected high school students for a successful college education. Of the 54 students participating in the Keene State College Upward Bound Summer program, 35 received instruction in career planning and decision making (CDM). The remaining 19 students formed the comparison group. All students completed a pretest-posttest survey. The one-way analysis of covariance used in the primary analysis produced unclear results. The secondary analysis utilized an effect-coded multiple regression partitioning model. Results from this analysis showed that both sex and age main effects were not significant, but both the treatment and the student's prior knowledge had significant main effects and a significant interaction. (Author/NRB)

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REPORT OF FINDINGS OF A PRIMARY AND A SECONDARY ANALYSIS OF THE EFFECTS OF CAREER EDUCATION ON CAREER DECISION-MAKING PROCESSES OF A SAMPLE OF UPWARD BOUND STUDENTS

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REPORT OF FINDINGS OF
A PRIMARY AND
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THE EFFECTS OF CAREER EDUCATION
ON CAREER DECISION-MAKING PROCESSES
OF A SAMPLE OF UPWARD BOUND STUDENTS

PROGRAM DESCRIPTION

Upward Bound is a federally funded program which provides a way for selected high school students to help themselves, make their high school years count for more and provide more choices for the future.

The purpose of Upward Bound is to motivate and help prepare these high school students for a successful college education which may consist of one, two, three or four years of college and can be geared toward a business, liberal arts, vocational, technical, nursing or other type of post-secondary education.

Students must invest time, effort and determination but no money. The time commitments are six weeks each summer, 2 - 6 hours a week for help during the school year, 2 meetings per month with Upward Bound field representatives, 3 days a year for career exploration and college visits and two weekends for conference/reunion meetings.

The summer program objectives are:

1. To improve basic reading, writing, math and oral communication skills.
2. To introduce new areas of interests through electives including drama, botany, music, photography, pottery, handcrafts, foreign languages, calculus, poetry, etc.
3. To provide an introduction to a career field and an earning opportunity through a part-time job off campus.

4. To acquaint students with community living and college routine.
5. To further develop self-confidence.

Specifically in the junior and senior years, Upward Bound helps students decide which colleges are appropriate for career interests, assists with visits, interviews, applications and financial aid.

Eligibility for admission to the Keene State College Upward Bound Program is as follows:

1. The family income of the student must not exceed the annual low income level established by the Department of Health, Education and Welfare of the United States Government.
2. The student should be completing 9th or 10th grade, exceptions are made for a student completing 11th grade if he or she is already fairly well motivated to undertake formal schooling beyond high school.
3. The student should be of average or above average ability although his or her past academic record may not reflect this ability.
4. The student should be reading above the 6th grade level. Experience has shown that if the student is reading below the junior high school level at the time he or she enters Upward Bound, chances are slight that enough improvement can be effected to enable him or her to undertake academic work on a college level.
5. In the judgment of a guidance counselor or teacher who knows the student well, he or she should have the potential for success in appropriate post-secondary education, but would probably not seek admission to college without the support which Upward Bound provides.

6. The student should be emotionally stable.
7. The student should not be involved with narcotic drugs or alcohol.
8. The student should not have serious problems with civil authorities.

*NOTE: The student and his or her family must complete and submit a "Student Request for Interview" form. The information supplied in this form will determine whether the student is financially eligible for Upward Bound. Forms can be obtained from the Guidance Counselor at school.

The Career Decision-Making Course upon which this research is based was a part of the Summer 1979 Upward Bound Program at Keene State College, and served to implement objective number three of the six-week summer session. The course utilized the Appalachia Educational Laboratory curriculum for secondary students, the Career Decision-Making textbook published by McKnight and edited by Winefordner and addressed the following topics: career goals, career values, career interests, aptitudes, work situations, work activities, decision-making, career exploration, occupational exploration; Dictionary of Occupational Titles, Occupational Outlook Handbook, and The Worker Trait Group Guide. The course was offered for one hour every morning and was taught in two sections.

The Keene State College Upward Bound Summer program was authorized to accept 70 registrants from among the many nominations and applications received. At the start of classes, 64 were actually enrolled. The administrative staff then assigned 42 of the 64 students to receive the instruction in career planning and decision making, hereinafter referred to as CDM. The remaining 22 students formed the comparison group. Assignment

was based on whether or not students had had chemistry previously, an offering which met in the same time slot.

After the administration of pre- and post-tests to both groups, a final n = 35 was obtained for students in the CDM program and an n = 19 for the comparison group.

The criterion assessment instrument consisted of a multi-dimensional survey containing 26 items which was designed for coverage of the entire "packaged" (AEL) curriculum which normally requires approximately 40 hours of group instruction. Due to last minute changes in scheduling which occurred after administration of the pretest, only 20 hours of instruction were allotted. Therefore, responses to some items of the instrument are requiring different analyses and interpretation than initially planned.

The instrument was designed to collect information upon the following: (1) career choices which they had made; (2) area of interest; (3) knowledge concerning occupation in their area of interest including entry requirements, nature of work, benefits, etc.; (4) knowledge of career decision-making procedures or steps; (5) knowledge of career definition; (6) use of career decision-making procedures; and (7) knowledge of procedures to obtain career information; (8) knowledge of career areas; and (9) attitudes toward career selection. Many of the times on the career survey inventory were close-ended questions. Four items were open-ended questions and four items were of the open-ended question format. Biographic data was collected on each respondent. Sociological coding procedures were used to quantify the open-ended questions.

All of the Upward Bound students were administered the same pretest survey questionnaire as a posttest immediately after the close of the course.

PRIMARY EVALUATION ANALYSIS

The primary analytic design involved the establishment of an array of relevant dependent variables from the evaluation questionnaire which was administered in a pretest-posttest, non-equivalent control group design and the establishment of an array of independent variables from treatment designation and from cluster analysis of student characteristics. The array of independent and dependent variables reported in the primary evaluation report are shown as follows:

Independent Variables:

I 1. Treatment group (directly from questionnaire)

I 2. Group Characteristics (age and sex combined in factorial manner - Occupational experience did not enter into the analysis since 97% of the students had the same experience level. The composite includes the following categories:

1 = age 14 female	5 = age 16 female
2 = age 14 male	6 = age 16 male
3 = age 15 female	7 = age 17 female
4 = age 15 male	8 = age 17 male

I 3. Student classification by type of knowledge held. (Q 3-7) A composite variable was attempted using NORMIX but satisfactory convergence was never found.

I 4. Student classification by type of knowledge about colleges held. (Q 2 and Q 8 - 10) NORMIX composite variable created has three groups.

Group 1 = 21 pupils: 12 females, 9 males, 8 treatment, 13 control, all scores two or below on the four questions

Group 2 = 17 pupils: 8 females, 9 males, 17 treatment, 0 control, scores mostly threes on four items

Group 3 = 16 pupils: 11 females, 5 males, 10 treatment, 6 control, scores four and threes on all four items

I 5. Student classification by knowledge of self-understanding of occupations (Q 11-16) NORMIX composite variable created 2 groups

Group 1 = 25 pupils: 10 females, 15 males, 18 treatment, 7 control, primarily three and fours on Q 11, 12, and 16 spread on Q 15, ones and twos on Q 13, and 14

Group 2 = 29 pupils: 21 females, 8 males, 17 treatment, 12 control, primarily twos and threes on Qs 11, 12, and 16 spread on Q 15, and threes and fours on Q 13 and 14

Dependent Variables

D 1. Knowledge of Occupations - summated scores on Qs 3-7.

D 2. Understanding of Self and Occupational Characteristics - summated score on Qs 11-16.

D 3. Steps in Decision Making - Q 17 direct.

D 4. Rating of Self in Effectiveness of Decision Making - Q 17A direct.

D 5. Work definition - Q 18 direct.

D 6. Career definition - Q 19 direct.

D 7. Source of Occupational Information - summated score on Qs 20-24.

D 8. Criteria for the Evaluation of Occupational Information - Q 25 direct.

D 9. Score on definitions (matching) of terms - Q 26.

Table #1 shows the distribution of the treatment and control groups by sex and age.

The primary analytic model used in the evaluation was a one-way Analysis of Covariance completed on selected dependent variables using their respective pretest scores as the covariants and the variables of

TABLE #1 Independent Variable 1 - Treatment Group
Independent Variable 1 - Treatment Group Membership crossed with Independent Variable 2 - Age and Sex Identification

KEY	Treatment Group Membership	F 14	M 14	F 15	M 15	F 16	M 16	F 17	M 17	Sub Total
Freq.	Control	5	1	3	2	1	3	3	1	19
Row %	N=19	26.3	5.3	15.8	10.5	5.3	15.8	15.8	5.3	38.2
Col. %		100.0	50.0	33.3	50.0	10.0	21.4	42.9	33.3	
Cell		9.3	1.9	5.6	3.7	1.9	5.6	5.6	1.9	
M=	Career	0	1	6	2	9	11	4	2	
Male	Education	00.0	2.9	17.1	5.7	25.7	31.4	11.4	5.7	35
F=	Participation	00.0	50.0	66.7	50.0	90.0	78.6	57.1	66.7	64.8
Female	N=35	0.0	1.9	11.1	3.7	16.7	20.4	7.4	3.7	
		5	2	9	4	10	14	7	3	
	Marginals	9.3	3.7	16.7	7.4	18.5	25.9	13.0	5.6	

TABLE #2 Primary Evaluation Results of the Analyses of Covariance

Dependent Variable	Significance Level for:	Treatment Groups	Sex/Age	Clusters
Knowledge of Occupations	(KNOW 1 or 2)	n.s.	n.s.	.10
Understanding of Self	(SELF 1 or 2)	n.s.	.01	.01
Steps in Decision-Making	(DECM 1 or 2)	.10	n.s.	n.s.
Definitions	(DEFN 1 or 2)	.05	.05	n.s.
Knowledge of Information Sources	(INFS 1 or 2)	n.s.	n.s.	.10

treatment, sex, age and clusters as independent variables in separate analyses.

Table #2 shows the results of these one-way analyses of covariance for the relevant dependent variables and the independent variables.

As is shown in Table #2, the results of the primary evaluation are not clear. Differences on the specific dependent variables are not consistent and appear scattered across the three independent variables. The reanalysis will combine the five dependent variables into an overall score for both pretesting and posttesting administration to investigate the summative effects of the instruction. Table #3 shows the correlations of the component scores or separate dependent variables to the overall scores for both the pretest and posttest administrations.

TABLE #3 Correlations of Component Scores to Total Score
Career Education Criterion Measures

	Score 2	Know 1	Self 1	Decm 1	Defn 1	Infs 1
Score 1	0.7271	0.9159	0.7445	0.5298	0.3532	0.2501
	(54)	(54)	(54)	(54)	(54)	(54)
	P=0.000	P=0.000	P=0.000	P=0.000	P=0.004	P=0.034
Score 2		Know 2	Self 2	Decm 2	Defn 2	Infs 2
		0.0346	0.8851	0.6408	0.4966	0.3878
		(54)	(54)	(54)	(54)	(54)
		P=0.000	P=0.000	P=0.000	P=0.000	P=0.002

All of the correlations increase in the posttesting administration indicating that the instruction may have had a summative effect. The reanalysis will also try to discern the influence of student characteristics on the instructional treatment.

SECONDARY EVALUATION ANALYSIS

The secondary analysis utilizes an effect coded multiple regression partitioning model as suggested by Kerlinger and Pedhazur (Multiple Regression in Behavioral Research, Holt, Rinehart and Winston, Inc., 1973, pages 231 and following). The model employs the following strategy: (1) compute the regression relationships (sums of squares due to regression) for each of the continuous independent variables; (2) use effect coding to compute the regression relationships (sum of squares due to regression) for each of the categorical independent variables; (3) dummy code the independent categorical variables and cross multiply the independent continuous variables by the dummy coding vectors; (4) compute the regression relationships (sum of squares due to regression) of the interaction between the categorical vectors with the continuous variables; (5) cross multiply the effect coding vectors and compute the regression relationships (sum of squares due to regression) of the interaction between the categorical vectors; (6) utilize the oddivitity quality of the sum of squares to generate F-tests for parallelism of the partitioned independent continuous variables with the overall regression line; (7) generate F-tests to test for differences in intercepts and regression coefficients. The F-tests, when considered together, allow the analyst to test for differences attributed to categorical variables, to categorical variable interactions, and to categorical/continuous variable interactions systematically.

RESULTS

Table #4 displays the variance partitions obtained for the analyses. The first test in the reanalysis is to ascertain if the regression is significant. This test is an F-test of the form: $F = \frac{SSREG/dfreg}{SSRES/dfres}$.

$F(4,49) = 30.03$ which is significant at the $p < .01$ level. $(F(4,49) \geq 3.74)$

Hence, the independent variables explain a significant amount of the dependent variable variance.

The next test is to ascertain if the treatment score 1 (beginning knowledge level) interaction vector produces a regression line different from the score 1-score 2 line. This test is also a F-test of the form:

$$F = \frac{(R^2_{\text{interaction CRT x score1}} - R^2_{\text{score1}})/(df_{\text{TRF score1}} - df_{\text{score1}})}{(1 - R^2_{\text{TRT score1}})/ 53-2-1)}$$

$$F\ (1,50) = \frac{(.6485-.5288)/1}{(.3153)/50}$$

$F\ (1,50) = 18.98$ which is significant at the p .01 level $(F(1,50)\ \ 7.17))$.

This significance indicates that the instruction does influence the relationship and allows tests of the regression partitions rather than of the intercepts. Table #5 shows the results of these F-tests.

Tests of these partitions show that both sex and age main effects are not significant but that both the treatment and prior knowledge have both significant ($p < .01$) main effects and a significant ($p < .01$) interaction. The group of Upward Bound students receiving instruction had a mean posttest score of 45.82 with a standard deviation of 14.96, while the control group had a mean posttest score of 36.12 with a standard deviation of 11.23.

TABLE #4 Analysis of Variance Partitions

Source	DF	Sum of Squares	R^2
Treatment-Regresssion	1	2954.33	.2663
Sex-Regression	1	240.66	.0217
Age-Regression	1	169.20	.0153
Score 1-Regression	1	5865.66	.5288
Combined-Regression	4	7596.65	.6847
Treatment-Score 1 Regression	2	7195.58	.6485
Sex-Age-Score 1 Regression	4	6088.85	.5488
Residual	49	3098.38	
Total	53	11095.03	

TABLE #5 F-Tests of Significance of Posttests Score Variance Explanation

Source	Sum of Squares	DF	Mean Square	F	Significance
Treatment-Regression	2954.33	1	2954.33	46.72	.01
Sex Regression	240.66	1	240.66	3.81	n.s.
Age Regression	169.20	1	169.20	2.68	n.s.
Score 1 Regression	5865.66	1	5865.66	92.76	.01
Residual	3098.38	49	63.23		
Total	11095.03	53			

For $p < .05$ $F(1,49) \geq 4.04$; For $p < .01$ $F(1,49) \geq 7.18$

KEENE STATE COLLEGE UPWARD BOUND

CAREER PLANNING AND DECISION-MAKING STUDENT SURVEY

Student's Name:_____ High School:_____

Social Security Number:_____

Age:_____ Sex:_____

1. What has been your work experience to this point?

____ I have been a student and not worked.

____ I have held part-time or summer jobs while attending school.

____ I have been employed full time (name occupation) _____

____ Other (describe) _____

_____

This survey is being administered to obtain information about "where you are now" in your career planning and decision-making process.

PART I

The following section deals with general questions about your status in college and your knowledge of career. There are no right or wrong answers. Respond to each question in the best way you can.

2. Knowledge About College Majors

How much do you know about the college majors? This includes the area of study, course requirements, and eventual employment opportunities. Check the statement below that shows how much you know.

____ I know nothing about college majors.

____ I know very little about college majors.

____ I know little about college majors.

____ I know some about college majors.

____ I know a great deal about college majors.

3. Knowledge About Occupations

How much do you know about the occupations and opportunities for employment that relate to college majors? Do you know what occupations you could enter? Check the statement below that shows how much you know.

____ I know nothing about the occupations and opportunities for employment that relate to college majors.

____ I know very little about the occupations and opportunities for employment that relate to college majors.

____ I know a little about the occupations and opportunities for employment that relate to college majors.

____ I know some about the occupations and opportunities for employment that relate to college majors.

____ I know a great deal about the occupations and opportunities for employment that relate to college majors.

For items 4 through 8, check the response that shows how much you knew about occupations that interest you.

4. How much do you know about the qualifications for employment in occupations that interest you?

____ nothing
____ very little
____ little
____ some
____ a great deal

5. How much do you know about the salary and benefits of occupations that interest you?

____ nothing
____ very little
____ little
____ some
____ a great deal

6. How much do you know about future job openings in the occupations that interest you?

____ nothing
____ very little
____ little
____ some
____ a great deal

7. How much do you know about occupational advancement in the occupations that interest you?

____ nothing
____ very little
____ little
____ some
____ a great deal

8. How much do you know about college preparation for employment in the occupations that interest you?

____ nothing
____ very little
____ little
____ some
____ a great deal

9. How much have you thought about selection of a college major? (check one)

____ I have not yet thought about selection of a college major.

____ I have thought very little about selection of a college major.

____ I have thought a little about selection of a college major.

____ I have thought some about the selection of a college major.

____ I have thought a great deal about the selection of a college major.

10. At what point are you in deciding upon a college major? (check one)

____ I have no idea about what my college major will be.

____ I have very little idea what my college major will be.

____ I have some idea about what my college major will be, but have not completely decided. I am currently considering

_____

_____

_____

____ I have decided upon a college major. It is _____.

For items 11 through 16, check the response that shows how well you understand yourself in relation to work.

11. How well do you understand your occupational interests?

____ not at all
____ a little
____ fairly well
____ well
____ extremely well
____ I'm not sure what this means

12. How well do you understand your work values?

____ not at all
____ a little
____ fairly well
____ well
____ extremely well
____ I'm not sure what this means

13. How well do you understand your career goals?

____ not at all
____ a little
____ fairly well
____ well
____ extremely well
____ I'm not sure what this means.

14. How well do you understand your aptitudes?

____ not at all
____ a little
____ fairly well
____ well
____ extremely well
____ I'm not sure what this means

15. How well do you understand your work competencies?

____ not at all
____ a little
____ fairly well
____ well
____ extremely well
____ I'm not sure what this means

16. How well do you understand your work skills?

____ not at all
____ a little
____ fairly well
____ well
____ extremely well
____ I'm not sure what this means

17. Frequently you must make career decisions. These decisions may relate to your school work or part-time or summer employment. How do you go about making an important decision? What steps do you follow? Describe briefly what you would do to reach an important decision.

On the following scale rate the effectiveness of your way of making decisions.

1	2	3	4	5
very poor	poor	adequate	good	excellent

18. What does the term work mean to you? What does it include? Write a definition.

19. What does the term career mean to you? Write a definition.

PART II

Assume you need information about an occupation. Read the following situations. In the space to the right of each situation, write the source you would go to for the information. If you do not know a source, place a (✓) mark in the right column.

Situation	Source	Don't Know a Source
20. I want to get an idea of what the job market will be like for oceanographers by the mid-1980's	_____	_____
21. I want to know what college majors I can pursue to become an oceanographer.	_____	_____
22. My favorite high school subject was biology. I want to know what groups of occupations are directly related to biology.	_____	_____
23. I want to know what occupations would involve creative thinking.	_____	_____
24. Where can I go to find occupations which do not require high mathematical abilities?	_____	_____

25. Occupational information can sometimes appear to be confusing and contradictory. In fact the more information you have, the more apparent this condition may be. When this problem occurs, what criteria would you use to evaluate information?

_____

_____

_____

_____

26. Read the definitions listed in the left column. Match each definition with the term it defines in the right column. In the space to the left of each definition, write the letter of the term it best defines.

____	activity intended to produce something of benefit to the individual or the society	a. career development
____	all of the tasks performed by a worker	b. career theme
____	continuous integration of values in relation to the milieu through work	c. deciding
____	use of knowledge of self to learn more about the world of work and use of knowledge of the world of work to learn more about self	d. occupational group arrangment
____	quickness or ease with which people can learn or develop understanding and skills	e. job
____	occupations which involve similar worker characteristics	f. worker trait group
____	things people learn and the skills they develop	g. occupation
____	achievement of self-integration in relation to the milieu through knowledge of self and milieu	h. occupational exploration
____	activity undertaken for personal pleasure	i. aptitudes
____	overriding principle that gives structure and meaning to the sequence of one's work, education and training experiences	j. leisure
		k. work
		l. career exploration
		m. competencies
		n. career goals
		o. abilities